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Two new psammophile species and new records of scorpions from the northern Cape Province of South Africa (Arachnida: Scorpionida)

by

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SYNOPSIS

Two new psammophile species of scorpions, *Opisthophthalmus ammopus* (Scorpionidae) and *Parabuthus distridor* (Buthidae), are described from the Richtersveld in the north-western Cape Province of South Africa. The following species, hitherto known only from Namibia (South West Africa) represent new records for the northern Cape Province: *Opisthophthalmus holmi* (Lawrence, 1969); *O. lornae* Lamoral, 1979 and *O. pygmaeus* Lamoral, 1979.

INTRODUCTION

The Richtersveld (mean annual rainfall 25–75 mm) is that arid part of the north-western Cape Province of South Africa which is delimited by the Orange River enclave in the north, the Atlantic seaboard from Alexander Bay to approximately Port Nolloth in the west and, approximately, imaginary lines between Port Nolloth and Steinkopf in the south and Steinkopf and Vioolsdrif in the east.

Large portions of the western half of the Richtersveld are sandy and partially consolidated sand dunes occur in some areas. The scorpion fauna of these sandy wastes has been sparsely sampled in the past and the fact that a collecting expedition to the area in February 1979 yielded two new species did not come entirely as a surprise.

Both new species exhibit morphological adaptations which are clearly indicative of a psammophile mode of life. One of the new species, *Parabuthus distridor*, is the first species, within the genus, to exhibit total absence of a stridulatory patch on the dorsal surface of caudal segments I and II.

A few species, previously known only from Namibia (South West Africa), represent new records for the Richtersveld and other parts of the northern Cape Province.

Colour descriptions are given using ISCC-NBS Colour Designation (Kelly & Deane 1965). Hemispermatophore and trichobothrial nomenclatures and the use of the Greek letter τ as a symbol for trichobothria follow the same approach as in my 1979 monograph on the scorpions of Namibia.

The material herein described was collected during an expedition largely financed with a running expenses grant from the South African Council for Scientific and Industrial Research. This financial backing is gratefully acknowledged. I am most grateful to Mr Ian Bampton and Ms Julia Barnley for their congenial assistance during the expedition.

Family Scorpionidae Pocock, 1893

Subfamily Scorpioninae Pocock, 1893

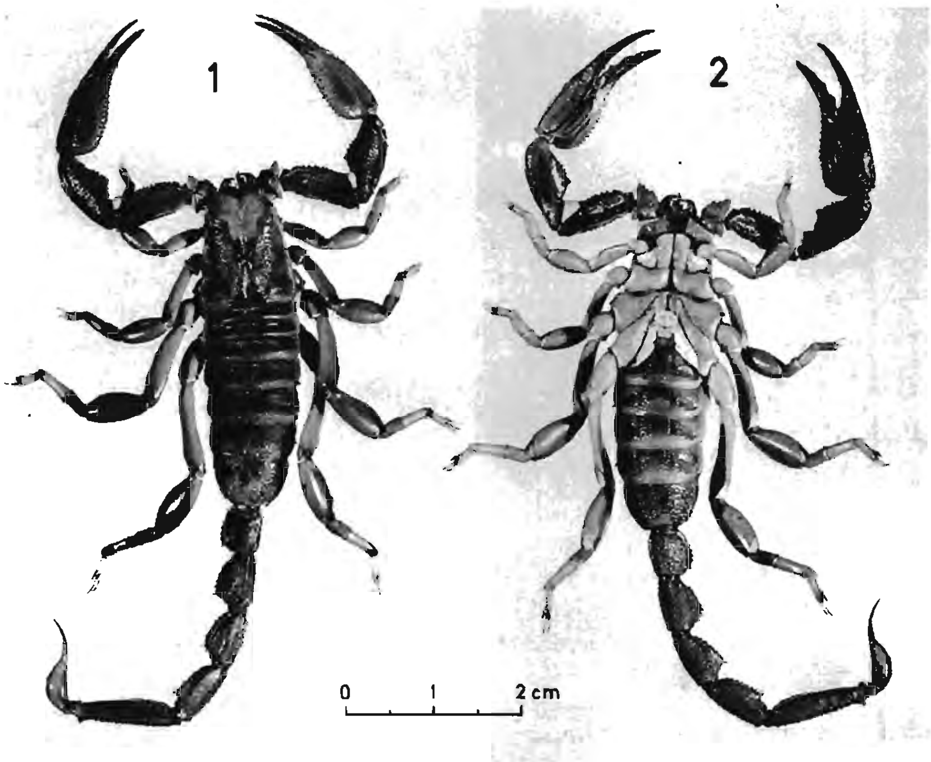
Genus *Opisthophthalmus* C. L. Koch, 1837

Opisthophthalmus ammopus sp. n. Figs 1–11

Derivation. ἄμμος f. (Gr.) = sand + ποῦς m. (Gr.) = foot. The derivation draws attention to the psammophile adaptations of this new species.

Diagnosis. O. ammopus is most closely related to *O. capensis* but can be separated from it and other species of the genus by the following combination of characters. Telotarsi I–IV: lateral claws long, distally sublinear and unequal in length within each pair (Figs 1, 2 & 9); median dorsal lobe well-developed and slightly longer than lateral lobes. Legs I and II with a single comb-like row of long setae on anterior and posterior margins. Ratio of carapace length/anterior distance of median eye 1,72. Anterior median furrow of carapace with a distinct longitudinal suture and anterior bifurcating suture.

Description. The type series consists of a ♂ holotype and 6 ♂ paratypes; no females have been collected. The following description is based on the adult ♂ holotype unless otherwise indicated.



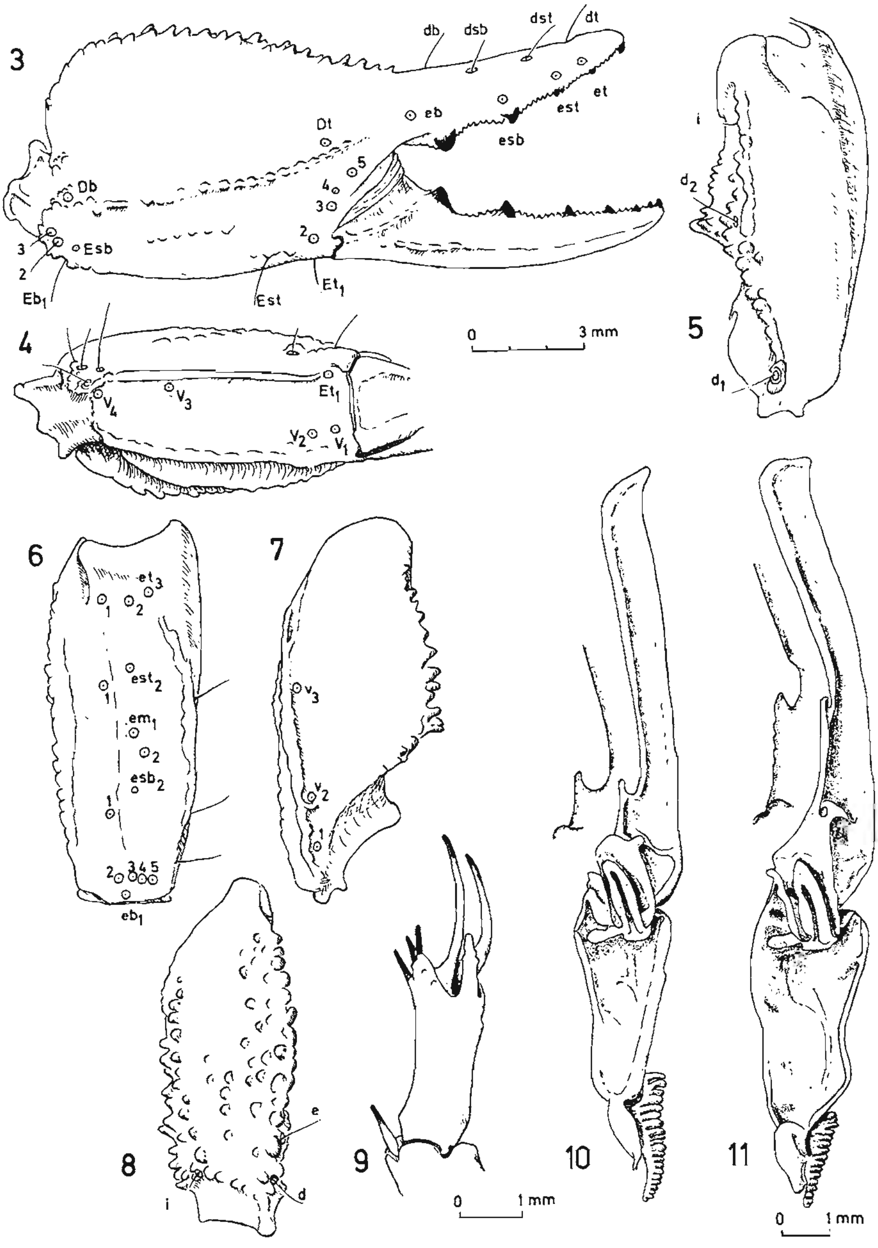
Figs 1–2. *Opisthophthalmus ammopus* sp. n., ♂ holotype (NM 11434). 1, dorsal; 2, ventral.

Colour. A fairly evenly coloured species. Pedipalps, chelicerae, carapace, cauda I–V strong brown No. 55 with interocular surface of carapace slightly paler than remaining surface. Tergites deep brown No. 56. Legs and telson brownish orange No. 54. Telson with a longitudinal band on either side laterally, which is slightly paler than remaining surfaces. Sternites deep yellowish-brown No. 75. Genital operculum and pectines dark orange yellow No. 72. Pedipalp keels and fingers dark reddish-brown No. 44.

Granulation. Pedipalp: upper and outer surfaces of handback, tibia and to a lesser extent inner surface of handback shallowly but evenly granular; finger keel of handback predominantly composed of shallow granules; outer and inner ventro-lateral keels of handback distinctly costate (Fig. 4); dorsal crest of handback consisting of spiniform granules (Fig. 3); inner dorso-lateral and inner ventro-lateral keels of tibia composed of blunt tubercules; inner and outer dorso- and ventro-lateral keels with blunt tubercules (Fig. 8). Carapace: interocular area shallowly granular, rest of surface distinctly granular. Tergites, Fig. 1: anterior half shagreened, posterior half granular. Sternites, Fig. 2: with shallow oval granules which occasionally anastamose medially. Legs I–IV, smooth and shiny with the exception of a lightly granular keel on ventral surface of femora. Caudal segments, Figs 1–2: dorsal keels of cauda I–IV composed of spiniform granules with an enlarged distal granule; dorsal keel of cauda V granular in anterior two-thirds, almost obsolete in posterior third; dorso-lateral keels of cauda I–IV granular, of V shallowly granular in anterior half, absent in posterior half; ventro-lateral keels of cauda I obsolete, of II–IV granular, of V with shallow spiniform granules; ventral keels of cauda I absent, of II almost obsolete, of III–IV granular, of V with short spiniform granules; ventral surface of cauda I with broad but shallow tubercules, lateral surfaces granular; ventral and lateral intercarinal surfaces of cauda II–IV lightly granular; ventral intercarinal surfaces of cauda V granular, lateral surfaces agranular; dorsal surface of cauda I granular, of II lightly granular, of III–IV very sparsely granular, of V lightly granular; telson agranular except for a very few spicules on antero-ventral surface.

Carapace, Fig. 1. Median eyes slightly posterior to medial point on longitudinal axis with ratio of carapace length/anterior distance 1,72. Anterior median furrow with a distinct longitudinal suture and anterior bifurcating suture; longitudinal suture of median ocular furrow present but poorly visible; posterior median furrow without a longitudinal suture.

Legs. Legs I and II: telotarsi, basitarsi, tibia, patella and femora posterior and anterior margins with a single comb-like row of long setae. Telotarsi III and IV without a ventral anterior row of spine-like setae but with the exception of a single distal spine-like seta on right telotarsus III of holotype. Telotarsi III and IV with a ventral posterior row of 4–5 spine-like setae. Telotarsi I–IV with a row of 3–4 spine-like setae on distal margin of anterior lateral lobes and similarly a row of 5 on posterior lateral lobes. Telotarsi I–IV with lateral claws long, distally sublinear and unequal in length within each pair (Figs 1, 2 & 9). Median dorsal lobe of telotarsi I–IV well-developed and slightly longer than lateral lobes (Fig. 9).



Figs 3–11. *Opisthophthalmus* species. 3–10, *O. ammopus* sp. n., ♂ holotype (NM 11434); 3–4, right hand; 3, outer aspect; 4, ventral aspect; 5–7, right pedipalp tibia; 5, dorsal aspect; 6, outer aspect; 7, ventral aspect; 8, right pedipalp femur, dorsal aspect; 9, right leg IV, anterior dorso-lateral aspect of telotarsus; 10, right hemispermatophore, ventral aspect with hook notch also shown in lateral outline. 11, *O. capensis* (Herbst, 1800), right hemispermatophore, ventral aspect with hook notch also shown in lateral outline (NM 11354). Scales: Figs 3–8, upper; 9–10, lower middle; 11, lower right.

Cauda. As in Figs 1 and 2. Telson aculeus only slightly curved.

Pectines. As in Fig. 2, with 8–9 teeth per pecten.

Sternum. As in Fig. 2, with length greater than width.

Setation. Pedipalp and caudal keels and lateral and posterior margins of sternites III–VII with rows of scattered setae. Intercarinal surfaces of pedipalps and cauda sparsely pilose. Telson pilose.

Trichobothria. As in Figs 3–8. (+1) neobothriotaxic for group C (Lamoral, 1979) with 14 external τ on tibia. τ V_1 of right chela has its trichium missing in the holotype. τ d_2 of tibia (Fig. 5) has migrated from the dorsal to the inner surface.

Hemispermatophore. As in Fig. 10. Differing diagnostically from that of *O. capensis* (Fig. 11) in the shape, length and size of the distal lamina, the hook notch, the median lobe, the distal crest of median lobe and the basal portion. Percentages of distances of hook apex to other structures in relation to various sets of distances are as follows for the hemispermatophores of *O. ammopus* and *O. capensis* illustrated in Figs 10 and 11 respectively:

	O. ammopus	*O. capensis*
1. ha → w distance × 100/dcr → w distance	29,66%	47,11%
2. ha → bsh distance × 100/ha → w distance	45,71%	56,14%
3. ha → bsh distance × 100/dcr → bsh distance	16,33%	33,33%

(ha = hook apex; w = waist; dcr = distal crest of distal lamina; bsh = basal scallop of hook).

Variation. The number of pectinal teeth in paratypes range from 8 to 11 per pecten. Otherwise little or no variation in paratypes.

Measurements. As obtainable from Figs 1–10.

Material examined. SOUTH AFRICA: Cape Province. Holotype ♂, Richtersveld, Sandy Ridge, 28°40'S, 16°53'E, 8 km south of Springklipberg, 21 February 1979, B. Lamoral (NM 11434, Type no. 2331); 5 ♂ paratypes, same data as holotype (NM 11290 and NM 11293–11295, Type no. 2332); 1 ♂ paratype, Mac Dougall Bay, 29°17'S, 16°53'E, sandy area approximately 1 km inland, 13 February 1979, B. Lamoral (NM 11284, Type no. 2332).

Distribution. Areas of soft sand in the north-western Cape Province of South Africa.

Bionomics. All the types were collected at night with the aid of an ultra-violet lamp and were found resting on sand dunes on soft sandy surfaces with surface hardness ranging from 0,50 to 2,0 kg cm^{-2} penetration force (soil hardness categories III–V in Lamoral's 1979, Table 2). No specimens were dug out of burrows and it is therefore impossible to verify whether these surfaces are the sites of *O. ammopus* burrows. The two type localities fall within areas supporting a Desert and Succulent Steppe type of vegetation.

Opisthophthalmus holmi (Lawrence, 1969)

This species had so far been recorded only from the central and southern Namib Desert in Namibia (Lamoral, 1979); the southernmost locality record being Rosh Pinah (27°58'S, 16°44'E). The material collected in the Richtersveld does not exhibit any marked difference from that collected at Rosh Pinah.

Material examined. SOUTH AFRICA: Cape Province, 2 subadult ♀, 1 juvenile ♀, Bloeddrif (28°21'S, 16°48'E), Richtersveld, 15 February 1979, B. Lamoral (NM 11347).

Opisthophthalmus lornae Lamoral, 1979

The description of *O. lornae* was based on a ♂ holotype and 20 ♂ paratypes collected from two localities in the south central region of Namibia (south of 27° of latitude and north of the Orange River). New material from two localities south of the Orange River in the northern Cape includes one juvenile female. This female differs from males as follows.

Granulation. Anterior two-thirds of carapace, tergite I–VII, sternites III–VII and ventral and lateral surfaces of cauda I–IV, smooth and shiny. Other surfaces as in male.

Pectines: The juvenile ♀ from Aggeneys has 7 teeth per pecten, and the row of teeth is situated along the distal half of each pecten. The 3 ♂ from Aggeneys have 8–12 and the 4 ♂ from Dabenoris farm have 11–14 teeth per pecten.

Material examined. SOUTH AFRICA: Cape Province. 1 juvenile ♀, 1 ♂, 1 subadult ♂, 1 juvenile ♂, Aggeneys (29°12'S, 18°50'E), 8 February 1979, B. Lamoral (NM 11292); 4 ♂, Dabenoris farm (28°55'S, 18°39'E), 10 February 1979, B. Lamoral (NM 11287).

Opisthophthalmus pygmaeus Lamoral, 1979

The original description was based on a ♀ holotype, 2 ♀ and 160 ♂ paratypes collected from three localities in the south central region of Namibia (south of 28° S and north of the Orange River). The following specimen agrees well with the ♀ types and represents the first specimen collected south of the Orange River: SOUTH AFRICA: Cape Province, 1 ♀, Koa plain (29°04'S, 18°06'E), 21 km south-west of Goodhouse, 31 January 1973, B. Lamoral (NM 10672).

Family Buthidae E. Simon, 1879

Subfamily Buthinae Kraepelin, 1899

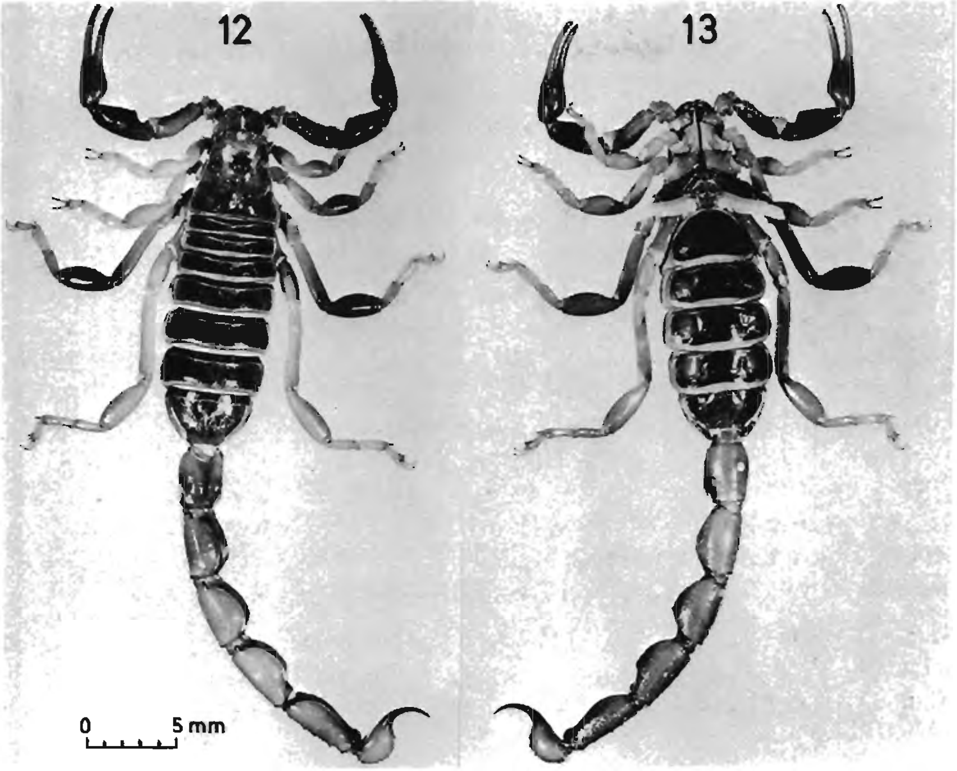
Genus *Parabuthus* Pocock, 1890

Parabuthus distridor sp. n. Figs 12–22

Derivation. dis (L.) = not, non + *stridor*, m. (L.) = stridulator.

Diagnosis. P. distridor is most closely related to the *P. nanus–P. gracilis* sister group which I described in 1979 from Namibia but can be separated from either of these or other species of the genus by the following combination of characters. Dorsal stridulatory patch of cauda I and II absent. Cauda I–IV ventral, ventrolateral and median lateral keels absent; dorso-lateral and dorsal keels obsolete.

Description. The type series consists of a ♀ holotype, 3 ♀ and 18 ♂ paratypes.

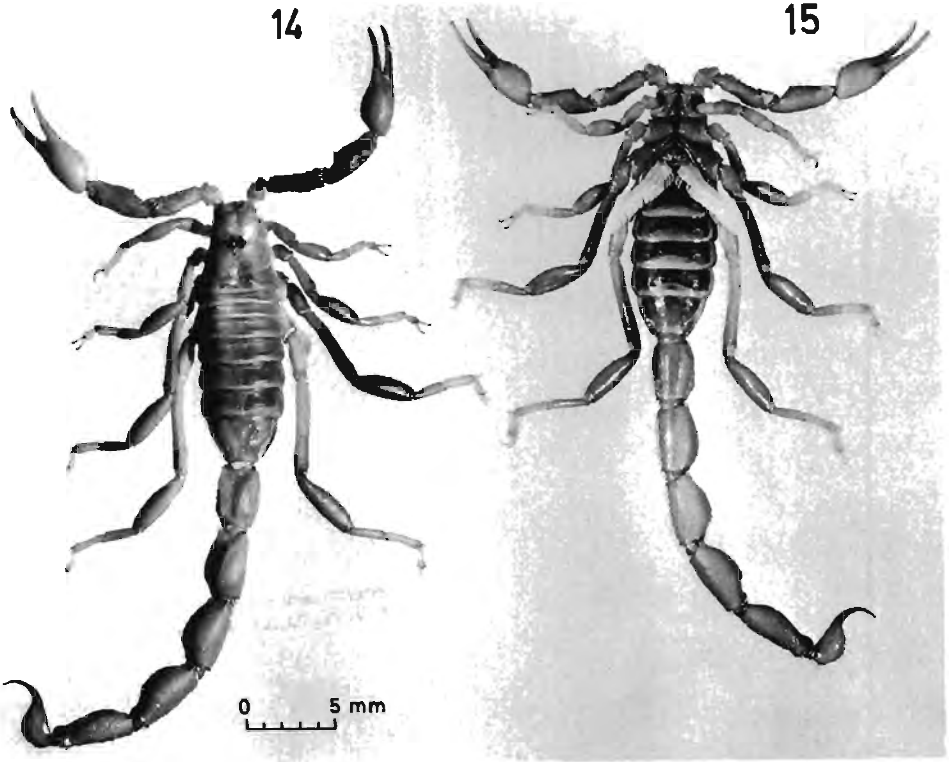


Figs 12–13. *Parabuthus distridor* sp. n., ♀ holotype (NM 11435). 12, dorsal; 13, ventral.

The following description is based on the adult ♀ holotype unless otherwise indicated.

Colour. A fairly evenly coloured species. Pedipalps, chelicerae and cauda I–V strong yellowish-brown No. 74. Carapace, tergites and sternites deep yellowish-brown No. 75. Legs and telson dark orange-yellow No. 72. Pectines light orange-yellow No. 70.

Granulation. Pedipalps: hand, tibia and ventral surface of femur smooth and shiny; keels of hand and tibia absent except for poorly developed antero-dorsal of tibia (Fig. 18); anterior, dorsal and posterior intercarinal surfaces of femur lightly granular; postero-dorsal, antero-dorsal and antero-ventral keels of femur, granular; postero-ventral keel of femur obsolete. Legs I–IV: coxae, trochanters, patellae, tibiae, basitarsi and telotarsi smooth and shiny and devoid of keels; femora, dorsal, anterior and ventral surfaces very lightly and shallowly granular, posterior surfaces smooth and shiny. Carapace, lightly and evenly granular throughout, devoid of keels. Tergites: smooth and shiny but with lateral extremes very lightly granular; dorso-median keel of I–II obsolete, of III–VI shallowly costate and agranular; tergite VII lightly granular, dorso-median keel obsolete, laterals shallowly granular. Sternites III–VII, smooth and shiny throughout. Caudal segments: ventral and lateral surfaces of I–II, anterior two-thirds of



Figs 14–15. *Parabuthus distridor* sp. n., ♂ paratype (NM 11436). 14, dorsal; 15, ventral.

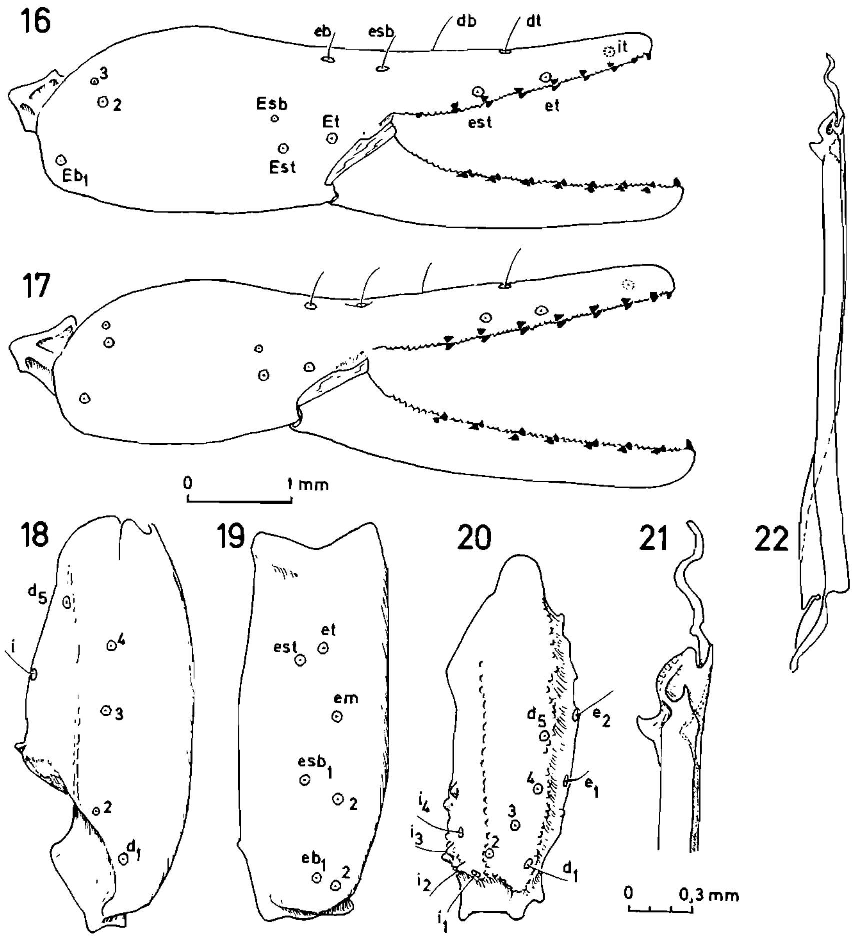
ventral and lateral surfaces of III, dorsal surfaces of I–V and telson, lateral surfaces of V and telson, smooth and shiny; posterior one-third of ventral and lateral surfaces of III, and ventral and lateral surfaces of IV very lightly and finely granular; ventral and lateral surfaces of IV and ventral surface of V finely and evenly granular; entire ventral surface of telson vesicle with scattered shallow granules; caudal keels and dorsal stridulatory patches of cauda I and II as in diagnosis. Ventro-lateral keels of cauda V granular, with one or two slightly enlarged granules in posterior region.

Chelicerae. Smooth and shiny. Ventral proximal margin of fixed finger with two small teeth.

Legs. Telotarsal ungues (lateral claws) fairly evenly curved, unusually long, particularly in legs I and II where the claws are distinctly longer than the telotarsi and twice as thick as and 25% longer than those of legs III and IV (Figs 12–15). Telotarsal pseudonychium (median claw) of legs I–II unusually well developed and twice as long as those of legs III and IV.

Cauda. Keels as under granulation.

Pectines. ♀ holotype 22 teeth per pecten. ♀ paratypes 22–23 and ♂ paratypes 23–27 teeth per pecten. Holotype ♀ with first proximal middle lamella of each pecten sub-oval, mesially enlarged and lobate.



Figs 16–22. *Parabuthus distridor* sp. n. 16, ♂ paratype (NM 11436), right hand, outer aspect; 17–20, ♀ holotype (NM 11435); 17, right hand, outer aspect; 18–19, right pedipalp tibia; 18, dorsal aspect; 19, outer aspect; 20, right pedipalp femur, dorsal aspect; 21–22, ♂ paratype (NM 11305), right hemispermatophore; 21, detail of ectal distal portion; 22, ectal aspect. Scales: Figs 16–20 & 22, centre left; 21, lower right.

Sternum. Almost sub-triangular with maximum width equal to maximum length.

Setation. Pedipalps and ventral and lateral surfaces of all caudal segments moderately pilose. Lateral and posterior margins of sternites III–VII with a row of sparsely distributed setae. Distal and middle lamellae and fulcra of pectines with numerous short setae. Posterior margins of telotarsi, basitarsi and tibiae of legs I–III with a comb-like row of long stiff setae. Ventral surfaces of telotarsi of legs III–IV and to a lesser extent leg II with a cluster each of scattered setae. Other leg segments, moderately pilose.

Trichobothria. Figs 16–20. Orthobothriotaxic for group A (Lamoral, 1979). τ *eb* and *esb* of fixed finger exceptionally proximal in location and more so than in related species; τ *eb* level with τ *Et* of handback. Tibia: τ *i* is unusually central on anterior surface; τ d_5 has migrated to upper distal region of anterior surface. Femur: τ d_2 on proximo-dorsal side of anterior dorso-lateral keel; dorsal and external τ are situated further away from the proximal end than in related species eg. τ d_5 is more than half-way across the dorsal surface and d_4 is almost level with e_1.

Hemispermatophore. Figs 21–22. *Pars recta* longer than in related species; *pars reflecta* short and not doubled back as in related and most species of *Parabuthus*.

Variation. Sexual dimorphism. Adult males differ from females in the following characters: ♂ pedipalp fingers shorter, handback longer, wider and swollen, with movable finger length/handback length ratios 1,13 (1,10–1,16) for ♂ and 1,88 (1,86–1,90) for ♀, while mean chela length is virtually the same in both sexes; ♂ proportionately more slender with width sternite V/carapace length ratios 1,04 (1,00–1,09) for ♂ and 1,23 (1,21–1,25) for ♀; first proximal middle lamina of each pecten mesially almost obtuse but not enlarged in ♂, sub-oval, mesially enlarged and lobate in ♀; ♂ with 23–27 and ♀ with 22–23 teeth per pecten.

Intraspecific variation. Little variation in type series.

Measurements. Obtainable from Figs 12–21. Total length of ♀ holotype (anterior margin of carapace to tip of sting) 4,5 cm, of largest ♂ paratype 4,0 cm.

Type material. Holotype and paratypes in Natal Museum collection. One male paratype from NM 11305 will be deposited in each of the following institutes: Museum national d'Histoire naturelle, Paris, France; British Museum (Natural History), London, England; American Museum of Natural History, New York; California Academy of Sciences, San Francisco, United States of America.

Material examined. SOUTH AFRICA: Cape Province. ♀ holotype (NM 11435), 1 ♂ paratype (NM 11436), 15 adult ♂ 2 subadult ♂ 1 adult ♀ 2 juvenile ♀ (NM 11305), all from Sandy Ridge (28°40'S, 16°53'E) 8 km south of Springklipberg, Richtersveld, 21 February 1979, B. Lamoral.

Bionomics. As for *Opisthophthalmus ammopus* sp. n.

Distribution. Areas of soft sand in the north-western Cape Province of South Africa.

REFERENCES

KELLY, K. L. & DEANE, B. J. 1965. *The ISCC-NBS method of designating colors and a dictionary of color names.* Nat. Bur. Standards circ. 553 (reprint ed.): V + 158. ISCC-NBS color-name charts illustrated with centroid colors (suppl. to NBS circ. 553).

KOCH, C. L. 1837. *Die Arachniden*, Nürnberg **4**: 1–135.

KRAEPELIN, K. 1899. *Scorpiones und Pedipalpi.* Das Tierreich **8**: 1–265, 94 figs.

LAMORAL, B. H. 1979. The scorpions of Namibia (Arachnida: Scorpionida). *Ann. Natal Mus.* **23** (3): 497–784, Figs 1–587.

LAWRENCE, R. F. 1969. A new genus of psammophile scorpion and new species of *Opisthophthalmus* from the Namib Desert. *Sci. Pap. Namib Desert Res. Stn.* **48**: 105–115, 4 figs.

POCOCK, R. I. 1890. A revision of the genera of scorpions of the family Buthidae with descriptions of some S. African species. *Proc. zool. Soc. Lond.* **1890**: 114–141, 2 pls.

——— 1893. Notes on the classification of scorpions, followed by some observations upon the synonymy with descriptions of new genera and species. *Ann. Mag. nat. Hist.* (6) **12**: 303–330, 2 pls.

SIMON, E. 1879. *Les Arachnides de France. VII. Contenant les Ordres des Chernetes, Scorpiones et Opiliones.* Pages 1–332, pls XVII–XXIV. Paris.

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